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ABSTRACT

The materials in this educational packet are designed for use with students in grades 4 through 7. They consist of an overview, three lesson plans, student data sheets, and a poster. The overview provides an introduction to the range and nature of conflicts that can occur between wildlife and people, discussing some of the reasons these problems arise and how some conflicts can be reduced or avoided with proper planning. A glossary and list of reference materials are included. The lesson plans provide a list of learning outcomes, instructional strategies, a list of materials needed, and an activity review sheet (with answers). Lesson activities include: (1) examining "nuisance" bird habitats on a field trip; (2) examining human viewpoints on wildlife by studying the golden eagle/sheep issue; and (3) playing a game (habitat hopscotch) to test wildlife knowledge. The two-sided poster emphasizes the situational nature of many wildlife conflicts by showing a raccoon in an appropriate natural setting and another in an urban setting (side 1) and provides (on side 2) the habitat hopscotch game board together with background information and game directions. Two additional activities (including a crossword puzzle) are also provided on a separate student handout. (JN)

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Wildlife Conflicts?

Issue Pac

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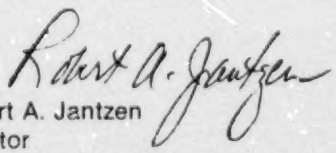
A Message To Educators

The Fish and Wildlife Service manages millions of acres of land, conducts wildlife research, raises fish for restocking depleted waters, and performs hundreds of other tasks designed to benefit fish and wildlife resources. However, as important as these activities are, we realize that in the long run an informed, motivated, and involved public can do more to benefit wildlife than all of our management activities.

This education package represents an important step in our efforts to provide teachers and other educators with factual information about wildlife, habitat, and resource management. We hope that you find these materials useful and that you will encourage your students to learn more about America's wildlife heritage.



Robert A. Jantzen
Director
U.S. Fish and Wildlife Service

These materials are designed for use with students in grades four through seven.

Contents

Leader Overview
The Overview is an introduction to the range and nature of conflicts that can occur between wildlife and people. Some of the reasons these problems arise are discussed, and a section on management shows how some conflicts can be reduced or avoided with proper planning. Boldfaced words are defined in the Glossary and reference materials are listed under Resources.

Poster: Side 1
The poster emphasizes the situational nature of many wildlife conflicts by showing a raccoon in an appropriate natural setting and another in an urban setting.

Poster: Side 2
The Habitat Hopscotch Game Board, shown on this side of the poster, supplies background information, illustrations, and game directions for use in Activity 3.

Student Page 1: Beak House
Match the animals to the place where they might live or nest in Beak House.

Student Page 2: Beak House Crossword
Use the animal names from Page 1 and the crossword puzzle clues to fill in the puzzle.

Activity 1: Observing Neighborhood Birds
Students will examine "nuisance" bird habitats on a field trip. They will learn:
- Conditions needed for specific birds to live;
- Possible conflicts between these birds and people; and
- How a building's design affects its use as wildlife habitat.

Activity 2: Real Life Management
This Activity introduces students to the human viewpoint of wildlife conflicts through a specific example, the golden eagle/sheep issue. As they become involved with the decision process surrounding wildlife conflicts, students will:
- Contact agencies involved in the issue;
- Collect facts and viewpoints from a variety of sources;
- Weigh the accuracy and biases of information collected; and
- Develop a viable management plan.

Activity 3: Habitat Hopscotch
This game tests students' wildlife conflict knowledge. Students will study:
- A variety of conflicts that might occur between wildlife and people; and
- Associations between specific conflicts and habitats.

Wildlife Conflicts?

Leader Overview

When both wildlife and people need the same resources from a **habitat**, a conflict arises. This conflict may involve only a small portion of the population, like the skunk which decides to live under your porch. The conflict may occur in only a portion of the habitat, as when conditions allow crop-eating grasshoppers to increase in a single farm region. Or the conflict may be restricted to a specific time of year, such as the fall when migrating ducks and geese can be found feeding on field crops. When conflicts of this sort arise, the wildlife involved is labeled a "**pest**" and a "nuisance." Frequently, actions are taken which are designed to resolve the conflict by providing for both human needs and those of the "pest" species.

Biologist Kenneth Watt has written that "a pest is a species operating without a long-evolved set of relationships with other species in its environment." The pigeons perching on a ledge, the woodpecker pecking at the telephone pole, the alligator on the golf course, the beavers in the power plant reservoir—all these can be pests. Most of the conflicts they are involved in, however, are local and/or seasonal. Some conflicts are only annoying; others can cause both human and wildlife death. When major damage is caused, the facts of wildlife and human coexistence are brought home more clearly. In this Pac, we will look at some **wildlife conflicts** and some management actions which consider wildlife and human needs. The wildlife conflicts we will discuss concern agriculture, technology, and urban development.

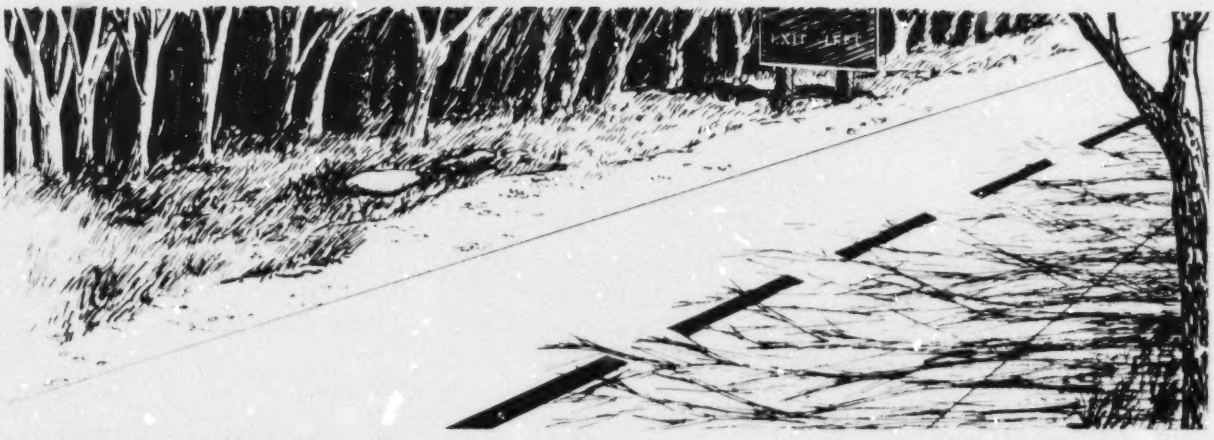
Agriculture and Wildlife Conflicts

A variety of wildlife/human conflicts can arise from conversion of a swamp, forest, marsh, etc. to farmland.

Blackbirds, along with migrating waterfowl, adapt their feeding and/or nesting habits to the farming practices along their traditional flyways. Thus they feed on Arkansas rice, Arizona sorghum, California fruits, Ohio corn, and other crops planted over drained marshes. Blackbirds and waterfowl cause over $60 million in crop damage annually.

Birds are not the only wildlife species which create problems for farmers. Foxes raid henhouses; coyotes prey on small farm animals; skunks raid beekeepers' honey supplies. These sorts of conflicts arise because wildlife has certain habitat requirements (e.g., food) which are fulfilled by human land use. When a natural wildlife habitat is totally or partially converted to agriculture, old food sources diminish, and new ones replace them. Thus, orchards planted in previously forested areas are browsed by deer and migratory geese will feed in cultivated wheat fields.

Another way conflicts arise between farmers and wildlife is



Edge created by road construction

through removal of native **predators**. For instance, fox populations might be reduced in an effort to protect livestock. In their absence, **prey** species (such as mice) increase in population and start a new set of problems by feeding on stored grains and feeds.

In addition, conflicts arise due to the **edge effect**, which allows wildlife species the benefits of two habitats butted against each other. Many animals, such as deer, foxes, snakes, and various birds, live in forests. When edge is created by the building of a road, highway, or farm, there is a clear area suitable for grazing and feeding while still protected by background trees. The clearing, however, borders a road. Thus, thousands of animals are killed annually on U.S. roads, sometimes causing destruction of property and loss of both human and animal life. Deer are common highway casualties, and because of their size, they cause much damage to human property and lives. Another problem is caused by muskrats, beavers and woodchucks burrowing under roads, often causing potholes or cave-ins.

The key to understanding why and how these conflicts arise in agricultural/rural areas is simple. Farms and roads on or near natural wildlife habitat make new food, shelters, and water sources available, often without the checks provided previously. Some wildlife species are able to take advantage of the introduced resources in the altered habitat and this causes conflicts.

Technology and Wildlife Conflicts

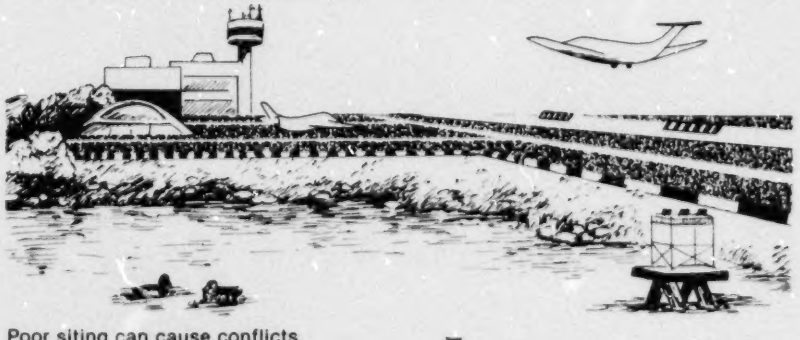
Many human developments have caused wildlife conflicts. Airports, hydroelectric power plants, and utility structures provide attractive habitats for a number of species.

Frequently, airports are built near water or wetlands. Gulls, blackbirds, and starlings occasionally fly across runways to reach nesting and feeding sites. Sometimes they collide with aircraft or are sucked into plane engines. In 1978 there were 788 bird strikes on aircraft in the U.S. causing $10 million in property loss and $500,000 in lost revenues.

A variety of birds roost on electric power lines and can cause power interruptions. By coiling in transformers, snakes can cause power outages, and squirrels do likewise when they chew insulation on lines. Woodpeckers are attracted to utility poles and have made necessary the replacement of many telephone poles. The operation of water cooling and intake systems of power plants has been interfered with by aquatic plant growth, beaver dams, and by the presence of jellyfish, alewives, and clams. In 1978 Commonwealth Edison of New York reported that wildlife caused 1,222 electrical service interruptions.

Urban Development and Wildlife Conflicts

Urban-dwelling wildlife species can create disturbances when they occasionally move indoors. Mice and rats frequently take advantage of the shelter and food available in residences. The same is true, to a lesser extent, of squirrels, raccoons, opossums,



Poor siting can cause conflicts.

lizards, bats, and snakes. These animals will find a niche in the house—usually the attic or cellar—that will fulfill their habitat needs. The fact that some of these wildlife species can carry disease and infection (such as rabies) makes them a less than desirable addition to the household. However, snakes and lizards might actually be beneficial if people were not frightened by them.

The opossum is well-adapted to urban areas.

Even outside, however, some of these household pests can cause problems. Raccoons are notorious for their nighttime garbage can raids. Moles frequently dig up lawns when burrowing. Rabbits, squirrels, and an occasional deer may feed on gardens, flowers, and shrubs. Squirrels may also compete with birds at bird-feeders. Insects are attracted to the lights of houses, and they in turn can attract insect-predators such as bats.

In city streets, too, wildlife can create problems. The pigeon is a notorious urban pest. Over three million live in New York City alone. Pigeon droppings can carry diseases which affect humans. Pigeons nest on buildings, ledges, nooks, crannies, exposed beams, lattice work, and other features similar to their native rocky cliffs. Starlings can remove screens to live in small air vent holes. Similarly, house sparrows nest in holes and crevices provided by certain types of buildings, with effects similar to those caused by pigeons.

As nuisance species or potential health hazards, these urban-adapted wildlife species contribute to the entire range of wildlife conflicts.

Scope and Management of Conflicts

It can be seen that the wide array of attractive habitats created inadvertently has led to a number of conflicts with wildlife. Sometimes these conflicts can be harmless and even funny, like the blue jay in a story by Mark Twain that tried to fill a cabin with nuts. Other conflicts are only annoying, like the noisy mockingbird singing in the middle of the night. Still others may be frightening, though again harmless, like the bat in the attic.

Some wildlife conflicts, however, can pose major economic or physical threats. These conflicts include the huge crop damage done each year by birds and insects or the human lives lost in collisions with deer on roads. Bats can carry rabies and other diseases.

However, major conflicts, like minor conflicts, can often be avoided or their impact reduced through careful planning and management. Encouraging hunting on farms and the use of mechanical noisemakers can serve to move geese out of farmers' fields and encourage them to feed elsewhere. Plant-breeders have produced new strains of grain which are less attractive to birds. In some cases, it's possible to harvest crops before bird populations build up during migration. Automobile collisions with deer can be reduced by using fences. Increasing visibility along roads by mowing and installing lights can also help. Problems due to birds at airports have been reduced by careful habitat manipulation—elimination of nearby ponds and other small bodies of water, mowing grassy areas to the proper height to reduce cover, and closing dumps and landfills near airports. Many urban animal problems can be avoided through proper handling of garbage as well as by planning buildings to provide as few nest or den sites as possible.

Unfortunately, it is only when major damage is caused that the facts of human and wildlife coexistence are brought home more clearly. Wildlife needs habitat for food, water, space, and cover. Humans, through development, provide, alter, and destroy habitats. Wildlife populations in turn respond with both positive and negative effects to these habitat changes. Thus conflicts arise. But conflicts can be avoided through proper planning and by noting how alterations will affect species. Many times, altering habitats can be mutually satisfying to people and wildlife. Desirable

Careful planning can prevent problems.

songbirds may be attracted by residential plantings, new sport fish can be introduced in a lake, and insect-eating birds may settle on a farm.

With technologically derived conflicts, more consideration can be given to location and construction of transportation, communication, and energy facilities to avoid disruptions of natural balances. Management of power facilities in particular has often been combined with establishment of wildlife refuges.

These are only a few examples of the measures being taken to reduce conflicts with and subsequent losses to wildlife. Through consideration of both wildlife and human needs, a great many serious wildlife conflicts can be avoided.

Glossary

edge effect—Interface between two habitats. This results in a habitat more attractive to wildlife than either area alone.
habitat—Place where a plant or animal is normally found. Must provide basic requirements (water, air, etc.).
pest—A plant or animal judged detrimental to humans.
predator—Animal which lives by feeding on other animals.
prey—An animal taken as food.
wildlife conflict—Situation which arises when wildlife and people use the same resources.

Resources

General References

Animals Nobody Loves, Ronald Rood. Stephen Green Press, Brattleboro, VT, 1971.
Ecology and Resource Management, Kenneth Watt. McGraw Hill, New York, 1968.
Ecology Out of Joint, Lorus and Margery Milne. Charles Scribner's Sons, New York, 1977.
Possum in the Parking Lot, Ronald Rood. Simon and Schuster, New York, 1977.

For Young Readers

Birds in the Street—The City Pigeon Book, Winifred and Cecil Lubell. Parents Magazine Press, New York, 1971.
The Controversial Coyote, Laurence Pringle. Harcourt, Brace, Jovanovich, New York, 1977.
Misunderstood Animals, Alice Hopf. McGraw Hill, New York, 1973.
Never Pet a Porcupine, George Laycock. W. W. Norton & Company, New York, 1965.
Never Trust a Cowbird, George Laycock. W. W. Norton & Company, New York, 1966.
The Varmints—Our Unwanted Wildlife, Michael Frome. Coward-McCann, New York, 1966.
Wildlife in Danger, Roy Pinney. Hawthorn Books, New York, 1966.

Films and Filmstrips

Environment Manipulation. Screenscope, Arlington, VA, 1975.
Insects Harmful to Man. International Film Bureau, Chicago, IL, 1977.
Insects Helpful to Man. International Film Bureau, Chicago, IL, 1977.
What Good is a Warbler? Adams Film Productions, Austin, TX, 1975.
The Wolf and the Whitetail. Stouffer Productions, Aspen, CO, 1979.

Wildlife Conflicts?

Activity 1

Observing Neighborhood Birds

Purpose

Students will learn about conflicts that may arise between certain bird species and people when a bird-attracting habitat is provided through human actions.

Learning Outcomes

After completing this Activity, students will be able to:

A. List a minimum of three habitat requirements for a given species.

B. Write a paragraph explaining why certain birds are problems in certain areas.

C. List a minimum of three design changes in a building that would reduce the number of nuisance birds in an area.

Organization

Who: Individual students

Where: Indoors, two urban or suburban field trip sites

When: Any time of year, May or June best

Time: Two hours indoors, two hours for field trips

Materials: For Each Student

- Two copies Data Sheet—Page 1
- One copy Data Sheet—Page 2
- Clipboard (Masonite or stiff cardboard with a paper clip or binder clip)
- Pencil

Directions

1. Provide each student with a copy of Data Sheet—Page 1 describing the nesting and feeding habits of pigeons, house sparrows, and starlings. After discussing the information and what a species needs to survive, generate a list of habitat requirements for the bird species. You may wish to study all three species or select one for concentrated study.

2. Use this discussion and habitat requirement list to prepare your students for the field study. Tell them they will be visiting two areas. They will compare these areas to see which is more attractive to certain types of birds.

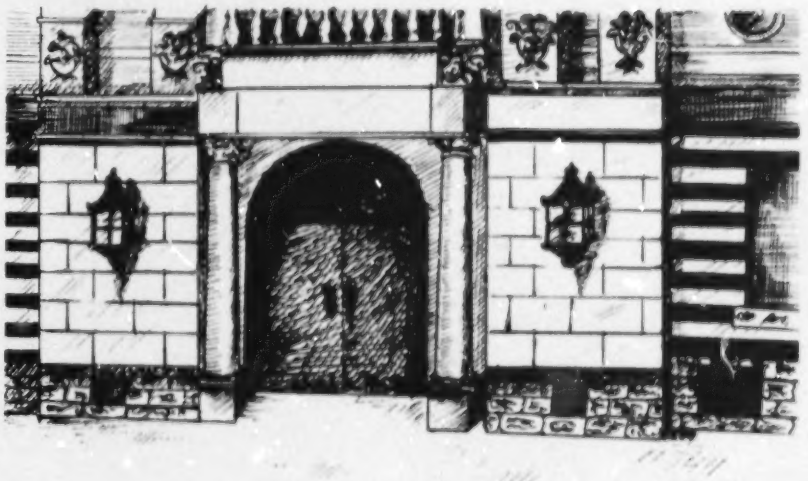
3. Select two sites to visit with the class. One should be an area with a high concentration of the bird species being investigated and the other should have a low concentration of starlings, pigeons, and house sparrows but greater numbers of other birds. To help you select these sites, you may wish to contact the local Audubon Society, the city animal control division, the area Fish and Wildlife Agency, the local office of the State Conservation Agency, a U.S. Fish and Wildlife Service, Wildlife Assistance or Animal Damage Control Office, or other wildlife interest groups.

4. At each field study site, have the students complete their Data Sheets based on what they observe. This may be done either individually or in small groups.

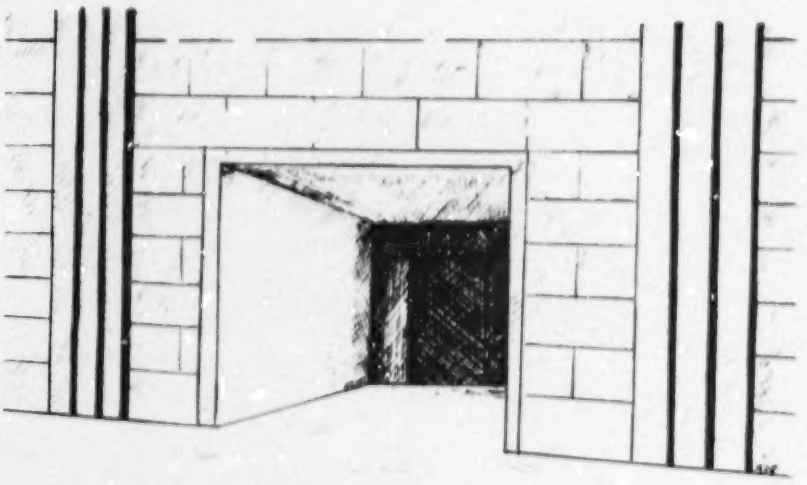
7. Based on what they learned from the fact sheets, field study, and class discussion, have each student write a paper about one of the bird species investigated, telling what its negative and positive points are and how people could change the environment to reduce or increase the numbers of this bird.

5. After returning to the classroom, students will compare their field observations with the list of habitat requirements. Were the requirements available at both field locations? (Remember that for some species, feeding sites are far removed from roosting and nesting sites.) Were habitat requirements more abundant or of better quality in one site than the other? Did this affect bird populations at the sites? The presence or absence of a species might also be influenced by competition for limited food or water with other species or by the presence of predators. Were other species observed at these sites? Were these other species predators or competitors for resources? Did this affect bird populations? How was this observed?

6. Have your students identify the area they liked better. Did their observations influence how they felt? Each student should decide whether the birds they observed are or are not nuisances. Ask them to write why they feel this way and what they could do to promote the species they liked.



Building with necessary requirements for bird habitat



Building without necessary requirements for bird habitat

Followup

To help students understand that the characterization of a bird as a nuisance depends on a variety of factors, such as time and numbers, have them research the introduction and spread of the English or house sparrow and the starling in the United States. Both birds were considered pleasant additions when introduced, but have since expanded their numbers and range to the detriment of native bird species.

Have students research and discuss ways in which desirable wildlife species can be encouraged in their neighborhoods. Discuss building design, food and water availability, open space, and nesting areas as elements to be considered in planning for wildlife.

Activity Review Answers

1. A starling needs food (insects, fruits, seeds, etc.); shelter (roosting and nesting sites); and a source of water.
2. **a, c, d.**
3. Building ledges, flat roofs, or bridge supports.
4. Reasons include noise, dirt, disease, crowding of more desirable birds, eating of cultivated fruits and grains, structural damage.
5. Possible changes include eliminating the ledges, replacing lattice work with solid material, blocking crannies between building and entryway, installing hardware cloth.

Name:

1. List three things that a starling needs in a habitat.

a. _____

_____

b. _____

_____

c. _____

_____

2. Circle the letters of the things a house sparrow eats.

a. Caterpillars
b. Young leaves
c. Beetles
d. Seeds
e. Grass

3. Complete this sentence. The pigeon, which nests on rock cliffs and outcroppings in the wild, uses_____

_____

as a suitable city nest site.

4. List three reasons a bird might be considered a pest in the city.

a. _____

_____

b. _____

_____

c. _____

_____

5. Circle two things you would change in the building pictured to reduce the number of places in which nuisance birds can nest. Describe how you would change the building.

a. _____

_____

_____

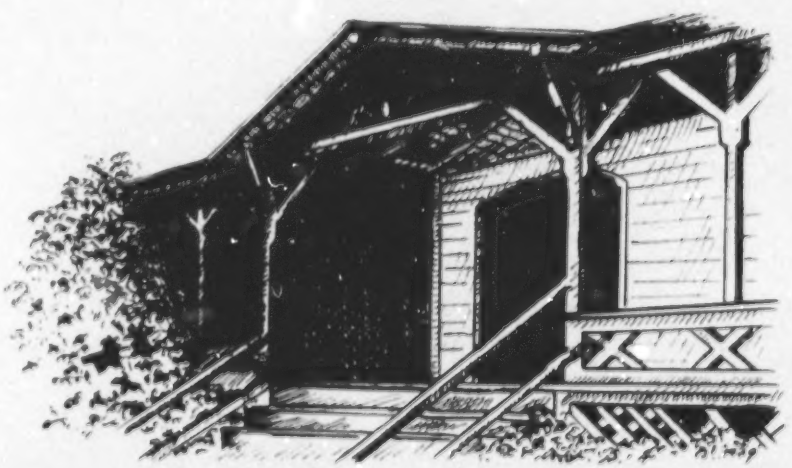
_____

b. _____

_____

_____

_____



Wildlife Conflicts?

Activity 2

Real Life Management

Purpose

In this Activity, students learn that many organizations and people become involved in wildlife/human conflicts. Students will perform some of the research, evaluation, and decision-making functions necessary to understand and resolve one such conflict. By doing so they will better understand the process involved.

Learning Outcomes

After completing this Activity, students will be able to:
A. List at least one factor influencing positions on the golden eagle/sheep issue.
B. Identify three steps necessary in forming a management decision.
C. Demonstrate communication skills by presenting a position paper which explains their views to the class.

Organization

Who: Groups of five or six
Where: Indoors
When: Any time of year
Time: Four to six hours for research; one to two hours for presentations and discussion

(**Note:** There will be an interval of approximately one month between writing for information and class preparation.)

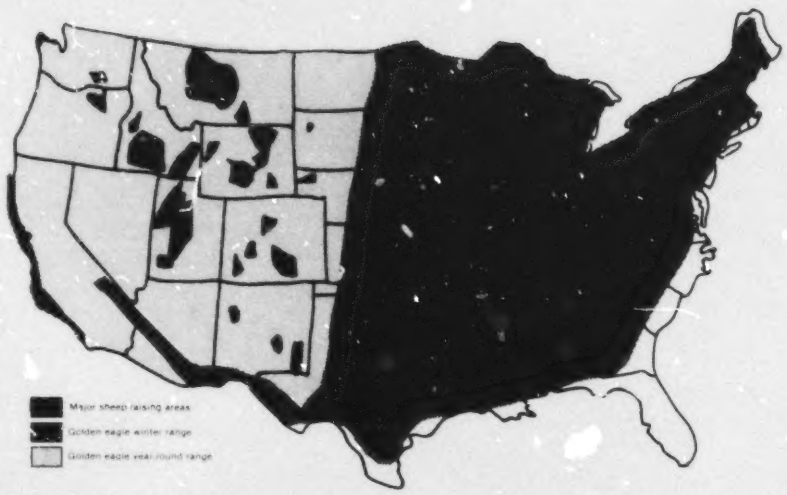
Materials: For Each Student

- Data Sheets

Directions

1. In this Activity, students will be introduced to an actual issue, the controversy over whether predation by golden eagles on lambs causes significant losses to ranchers. They will also contact different groups involved to obtain information about the various sides of the issue. The eagle/lamb issue is basically a local problem and is a matter of concern only to certain specific groups. For these reasons, the issue becomes less significant when we consider the overall magnitude of wildlife conflicts. However, the issue has been chosen because it is an excellent example of a controversial wildlife/human conflict that will function as a vehicle for students to learn much about the process of dealing with such conflicts. Read over the materials to acquaint yourself with the different viewpoints before presenting the Activity to the class. In brief, ranchers in parts of the United States believe that golden eagles kill and feed on a significant portion of their lambs. Estimates of loss are as high as 18% of a season's lambs on some ranches. Environmental groups, such as the Audubon Society and the Sierra Club, feel the eagles do not cause enough damage to make control measures necessary.

2. Hand out Data Sheet—Page 1. This contains information about the eagle/lamb issue which the class will investigate. After the students read the background information, discuss the issues involved. Questions to lead the discussion include: What is a golden eagle? Where does it live? What does it feed on? In what ways might its feeding habits affect other populations, wildlife and human? If so, whom? What is the issue between the ranchers and the golden eagle supporters? What is being done? Who is involved in the issue? What are the sides in the case of the golden



Eagle/lamb conflict areas

eagle? (The answers to these last questions are on Data Sheet—Page 2, which includes a list of organizations involved in the golden eagle/lamb controversy.)

3. Following this brief introductory discussion, the class will contact the various organizations involved in the controversy. Divide the class into groups based on the number of interest groups to be contacted. The names and addresses of these groups are given on the Data Sheet along with brief statements of their positions on the subject. The groups include involved government agencies, conservation groups, and woolgrowing and ranching associations. In addition, students may contact State environmental conservation departments or local woolgrowers associations to investigate viewpoints at the local level.

4. Have each group write one letter to its organization, requesting information about the golden eagle/lamb issue. The letter should focus on the number of golden eagles in the ranch area, amount of livestock damage, time of year the problem occurs, etc. Before mailing the letters, check each for spelling, grammar, and reasoning. Also be sure to keep a copy of the letter for each group to share after the information is supplied.

5. To maintain interest while waiting for responses, the class should collect any relevant magazine or newspaper articles and individually research golden eagles and lambs, the issues involved, and the interest group they contacted. This additional information should be filed along with their original letter of inquiry and the information as it is received. Speakers representing several points of view might also be invited to address the class.

6. After allowing sufficient time for the agencies to reply, each group will make a presentation based on the information it received and/or the information which it gathered on its own. In a five- to ten-minute period, students should explain the viewpoint of the organization they contacted. In addition, students should write a position paper based on what they learned.

7. After all groups have made their presentations, hold a class discussion about the issue. Bring in information from other sections of this Pac, particularly the ideas concerning management, habitat manipulation, and the need to protect both wildlife and people's livelihoods. Have the class produce a single position paper explaining the current situation and how it should be handled.

Foliowup

The class may wish to send copies of their position papers to the groups from which they received information.

Geese feeding on winter wheat and coyotes preying on sheep are two other controversies similar to the golden eagle/lamb issue. Discuss possible interest groups involved in these issues. Pursue one or both of these subjects along the same lines as with the golden eagle. This time have the class prepare their own data/background sheet. Other wildlife species may present additional localized cases to study.

Activity Review Answers

1. False. The number of golden eagles has increased somewhat in recent years. However, if eagles feed on lambs it is probably because lambs are an attractive and available prey.

2. A sheep rancher. While golden eagles may feed on calves which die from other causes, they don't usually kill calves. However, lambs are smaller and more vulnerable.

3. Reasons include disease, starvation, other predators, being stillborn, sudden changes in weather, being abandoned by the ewe.

4. **a**-4; **b**-1; **c**-2; **d**-3.

5. Yes, this process could be used. Groups that would be concerned include farmers, wildlife managers, hunters, and wildlife protection groups.

Wildlife Conflicts?

Activity 2

Activity Review

Name:

1. Golden eagles cause problems for ranchers because the number of eagles has increased greatly in recent years and they must now feed on lambs or starve. True or False? _____

2. Which of these people would be more concerned about having golden eagles in an area—a cattle rancher or a sheep rancher?

_____

Explain your answer._____

_____

_____

_____

_____

_____

_____

_____

3. List three reasons (besides being preyed on by eagles) why lambs might not survive.

a. _____

_____

b. _____

_____

c. _____

_____

4. In this Activity, you devised a position statement. Match the planning step with what you did at that step.

_____ **a.** understand problem and who is involved
_____ **b.** gather information on problem
_____ **c.** weigh and consider information
_____ **d.** form judgment and describe plan

1. write to interest groups for information
2. class discussion of information
3. write class position statement
4. read information on Data Sheet

5. Could you use the same process you used in this Activity to form a position on a wildlife conflict dealing with geese in a farmer's wheat field?

Yes _____ No _____

Name two groups of people who would be interested in this problem.

a. _____

_____

b. _____

_____

Wildlife Conflicts?

Activity 3

Habitat Hopscotch

Purpose

By asking questions in the form of a game, this Activity will teach and reinforce facts about humans, wildlife, habitats, and their interactions and conflicts.

Learning Outcomes

After completing this Activity, students will be able to:
A. List one wildlife conflict for each of the four habitats shown on the game board.
B. Match conflicts with the actions that caused them.
C. List species that might be considered pests in a given habitat.

Organization

Who: Groups of four
Where: Indoors
When: Any time of year
Time: One to two hours

Materials: For Each Group

- Four Data Sheets (making a complete game board)
- One die
- One set of game cards (14 in a deck)
- Clear tape (for joining game board)
- Cardboard (optional)

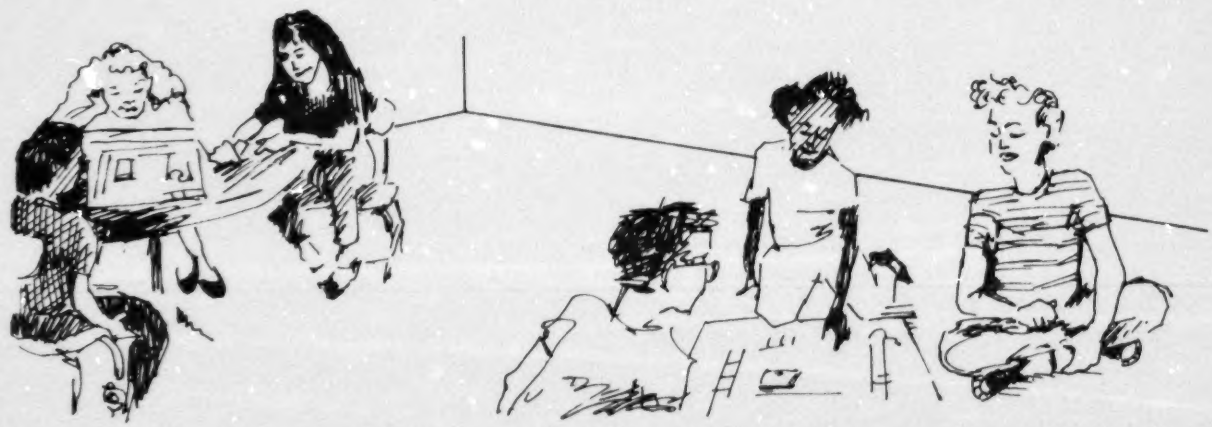
Materials: For Each Student

- Data Sheet (¼ of game board)
- Colored pencils, crayons
- Playing piece (coin, marked chip, or slip of colored paper)
- Copy of game rules

Note: This Activity should be used at the end of the Wildlife Conflicts? unit. By then, students will have been introduced to most of the facts and concepts necessary to play (and win!) the game. Some of the information used in the game card questions will be new and unfamiliar to the students. However, these questions are presented in such a way that the student has a high likelihood of answering correctly. This way, the learner acquires information and a sense of satisfaction. Additional questions can be prepared by the leader or the students.

Directions

1. Copy the game cards sheets and cut them to make a complete set of cards for each group. Copy the game board Data Sheets so that each group can have all four pieces that complete the game board.
2. Divide the class into groups of four. Give each group a set of game cards and provide each student in the group with one of the quarters of the game board.
3. Have students draw and color animals and landscape to suit the habitat of their quarter.
4. Have the students either tape their game board pieces together or mount the four squares onto a piece of cardboard backing.



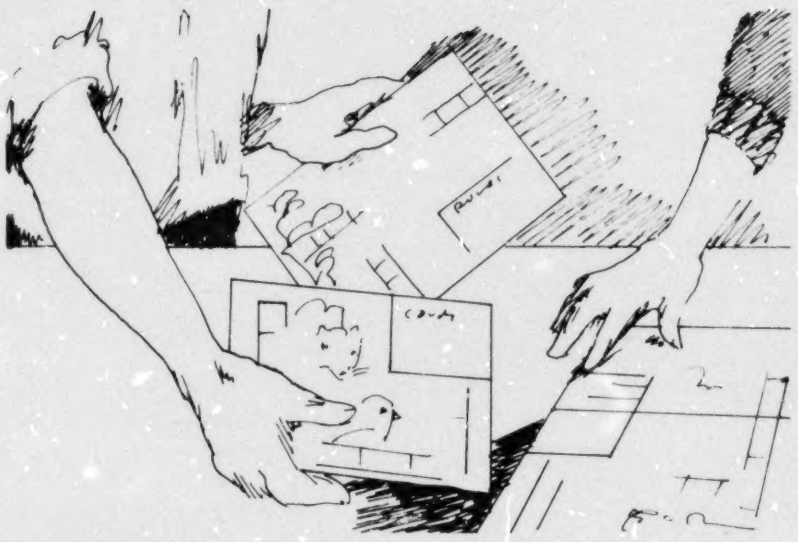
5. Using the second side of the poster as an illustration, review the rules with the class. The second side of the poster is a more elaborate, two-color version of the board with the complete rules on it. It should be posted during the game for student reference.

Game Rules

1. The object of the game is to be the first player to reach the square marked "Wildlife Refuge." To do this, players must roll the die, move that number of spaces, and follow the directions indicated on the space where they land.

2. To determine who plays first, each student rolls the die. The player with the highest roll plays first, followed by the student on the right, and so on around the board.

3. To play, the student rolls the die and then moves his or her marker that many spaces. The space landed on may require the player to answer a question, go forward or back based on what is happening there, or merely wait for another turn. Two or more players may share the same space.



Students putting game board together

4. If players land on a question space, the person to their right draws the top card from the deck. Each card has four questions which correspond to the four habitats. The player who drew the card reads the question for the player whose turn it is. The question read is named the same as the habitat the player is in. For example, if you land on a question space in the forest habitat, the player to your right will draw a card and read the forest question for you to answer.

5. After the player has answered the question, the player reading the question gives the correct answer (shown on the card following the question). If the answer given was correct, the player moves forward one space; if incorrect, the player moves back one space.

6. A player's turn is over after the player has landed on a space and followed any instructions there. Although the instructions may direct the player to move to a new square, this new square should be regarded as a free space. The player does *not* follow any instructions on the second square.

7. The question cards are returned to the bottom of the deck after each turn.

8. The game is over when one player reaches the "Wildlife Refuge." However, the die roll must be exactly the count necessary to reach the refuge. Therefore, if you are three spaces from the "Wildlife Refuge" and roll a six, you must wait a turn and try again.

Activity Review Answers

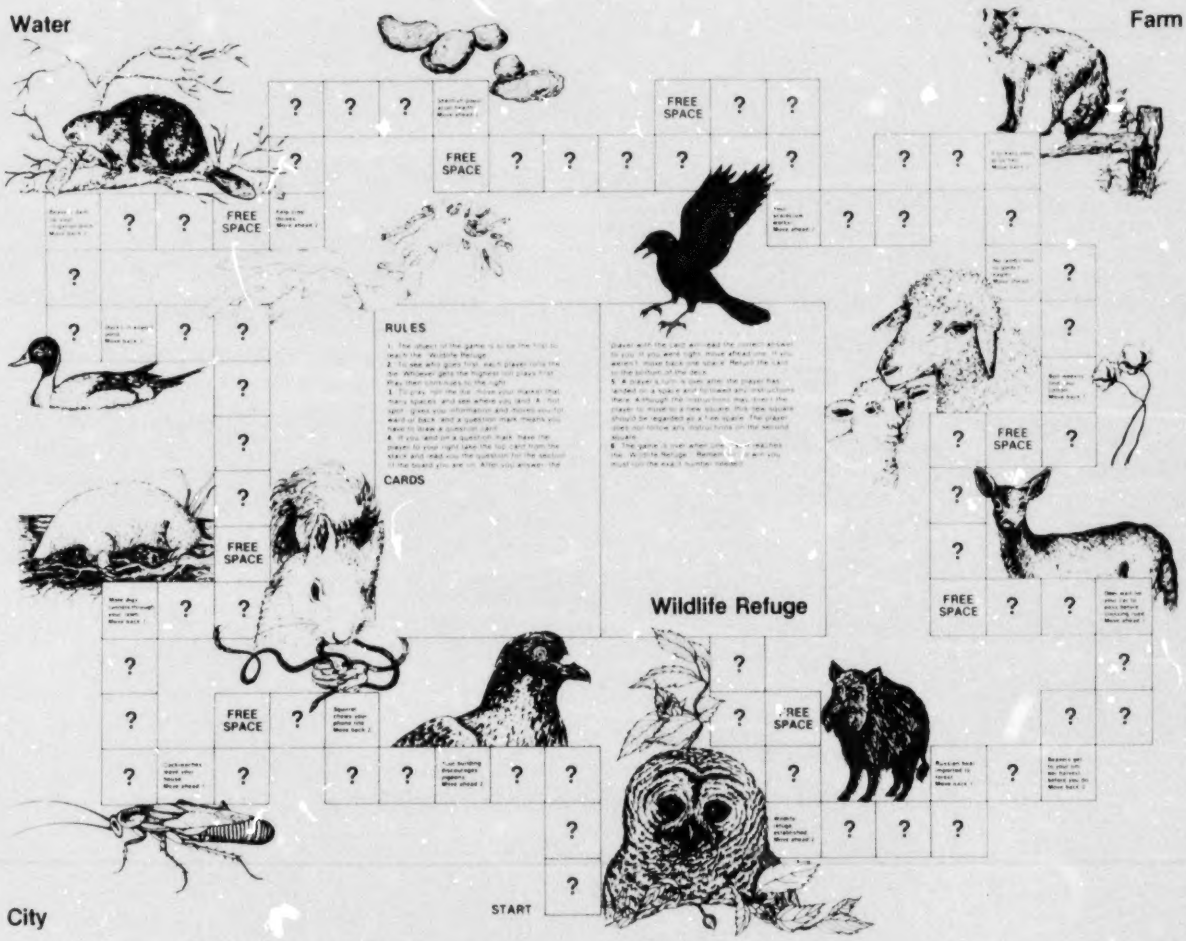
1. Forest: **e**-2 (may also be in Water habitat). Farm: **b**-3; **c**-5. City: **a**-6; **f**-4. Water: **d**-1 (**e**-2 also).

2. b.

3. Lake pests—sea lamprey, water hyacinth. In or near home pests—pigeon, cockroach, starling.

4. There would be a conflict between the Savannah hawk, which needs to eat the peach snail to survive, and people who want to harvest the snail. This could result in actions which would reduce the hawk population or place severe pressure on the snail population to supply both groups.

5. True—Bison need a great deal of space for their habitat and would compete with settlers' cattle for grass, space, and water.



Completed game board

Name:

1. Match the animal with the conflict it is part of and write the letter and number in the correct habitat box.

a. Pigeon
b. Coyote
c. Canada goose
d. Sea lamprey
e. Beaver
f. Raccoon

1. Feeds on game fish in Great Lakes.
2. Uses trees valuable to humans and blocks waterways.
3. Feeds on a farmers' chickens and sheep.
4. Raids garbage cans.
5. Eats young wheat plants.
6. Nests on building ledges, makes noise, and may spread disease.

Forest	Farm
City	Water

2. Over $350 million of crop, timber, and livestock damage is caused by wildlife each year. How much of this crop damage is caused by birds?

a. $120 million
b. $ 60 million
c. $ 75 million
d. $ 30 million

3. Which of the following might be a pest in a lake habitat? _____

In or near a home? _____

Trout	Sea lamprey
Pigeon	Mallard duck
Water hyacinth	Bluebird
Cockroach	Starling

4. Describe what conflict might result from this make-believe situation. The Savannah hawk feeds almost entirely on the peach snail that lives in the marshes of a Southern State. What might happen if people decided the peach snail was very valuable as fish food and they wanted to use them instead of letting the hawk eat them?

_____

_____

5. The bison and the settlers could not have shared the Great Plains. True or False? _____

Explain your answer. _____

_____

_____

_____

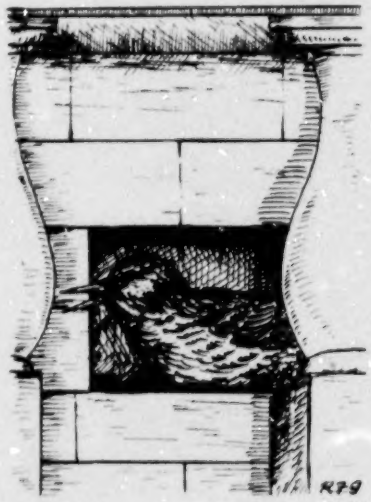
_____

Wildlife Conflicts?

Activity 1

Data Sheet

Name:



Starling

The noisy, chattering flocks of black birds common to towns and fields usually include large numbers of starlings. About eight inches long with shiny black feathers, the starling eats almost anything but prefers berries, insects, or garbage. Holes in trees or cavities of buildings are usual nesting sites as long as the opening is at least 1½ inches in diameter. A starling will raise one or two nests a year of four or five eggs each. These eggs hatch in twelve days. To locate a starling nest, watch for nest-building activity around older trees at the edge of the woods or around buildings with many nooks and crannies. You can also observe starlings as they flock together at dusk to form huge groups.

House Sparrow

The house sparrow, or English sparrow, is about six inches long and is found in cities, towns, and rural areas across the country. It eats mostly insects and seeds. Sparrows can live closely with people, and large numbers sometimes roost together at night. During the spring, summer, and late fall, sparrows build their nests and care for their young. The nest is 10 to 30 feet off the ground in any nook or cranny that a building can offer and is made from grass, string, and other debris. During nesting season, a female may raise three broods with from four to six eggs each. The eggs will hatch in twelve days. To find a house sparrow nest, watch for birds carrying materials or food to a cavity or cranny of a building.

Pigeon

The pigeon, or rock dove, is a common city bird. It is about thirteen inches long and may be gray, white, brown, or various combinations of these colors. A pigeon feeds on seeds, grain, fruits, and insects. In addition, it has a need for water, a roosting site, and a place to build a nest. A pigeon nest is a loose collection of sticks usually located on a ledge or other flat ornamental surface of a building. To find one, watch for male pigeons collecting sticks and twigs or look for droppings on the ground below ledges. Generally, the female lays two eggs which hatch in 18 days. In some areas pigeons can be found nesting throughout the year.

Wildlife Conflicts?
Bird Observations

Activity 1

Data Sheet

Name:

Place_____

Day _____

Time _____

Building features	How people use the area
Potential sources of food for birds	Potential sources of water for birds
Type of vegetation present	Potential nesting sites
Approximate number of bird species seen and studied	Other signs or sightings of animals or birds

Wildlife Conflicts? Lambs and Golden Eagles

Activity 2

Data Sheet

Name:

The golden eagle is a large bird of prey, found mostly in the mountains and rocky regions of the United States. Its body is about 32 inches long with a wingspan of over six feet. The golden eagle nests on cliffs or trees, and lays from one to four eggs every year. An excellent hunter, the golden eagle feeds on a variety of birds and mammals. These include jackrabbits, ground squirrels, and grouse—wildlife species native to the mountain and bush areas which the eagle inhabits. Golden eagles have been known to feed on foxes, dogs, and fawns as well.

Sheep and goat ranches are found in much of the American West and Mid-West. Frequently, these ranches are located on the breeding or wintering ranges of the golden eagle. The result is a predation of lambs and kids by golden eagles. Ranchers in Texas have claimed that almost 30% of their kid losses and 18% of their lamb losses are due to golden eagles. A rancher in Montana has blamed 76% of his lamb losses on predation by golden eagles.

Ranchers would like to decrease the amount of predation. However, the golden eagle is protected by a number of strong laws. The poisoning or shooting of the eagles carries heavy fines and often ends up in expensive legal battles.

In order to get individual kill permits from the Department of the Interior, ranchers must provide proof of the losses in their flocks due to eagle predation. Because of the golden eagle population control laws, no permits have been issued since 1970. Therefore, ranchers cannot shoot those predatory eagles disturbing their flocks and profits.

When other protective measures fail or are ruled impractical, the Fish and Wildlife Service is using live-trapping of golden eagles in certain areas. This method traps the eagle when it tries to kill lambs or goats. The eagle is then released in an area where it cannot interfere with ranching practices. According to ranchers, this technique is expensive and inefficient.

Environmentalists say that poor management of sheep and goat herds is the cause of losses blamed on golden eagles. Ranchers say they are unable to manage their local eagle problems because of tight government controls.

Wildlife Conflicts? Involved Agencies

Activity 2

Data Sheet

Name:

The following is a list of agencies and organizations involved in the golden eagle/lamb issue.

1. Mary Cronberg, National Woolgrowers Association, 600 Crandall Building, Salt Lake City, Utah 84101
The National Woolgrowers Association makes available papers stating its position in the golden eagle/lamb controversy, including loss statistics, case histories, etc.

2. Publications Division, Department of the Interior, Fish and Wildlife Service, Washington, D.C. 20240
The U.S. Fish and Wildlife Service has available a fact sheet about the golden eagle (general reference).

3. Defenders of Wildlife, 1244 19th Street, N.W., Washington, D.C. 20036
Defenders of Wildlife offers general fact sheets concerning the golden eagle and its predatory habits. In addition, it has information available about non-lethal techniques for dealing with predators, particularly the coyote.

4. National Audubon Society, 950 3rd Avenue, New York, New York 10022
National Audubon, the U.S. Fish and Wildlife Service, and the National Woolgrowers Association conducted studies on the golden eagle's lamb predation in the 1960s. Summaries of these reports are available.

References

Golden Eagle Management—A Conceptual Plan, Animal Damage Control, U.S. Fish and Wildlife Service. Department of the Interior, Washington, DC, September, 1980 (copies may be limited).

Hawks and Eagles, John Neary.

National Wildlife, National Wildlife Federation, Washington, D.C., August-September, 1980, pages 3-13.

Incident At Eagle Ranch, Donald G. Schueler. Sierra Club Books, San Francisco, 1980.

FARM QUESTION: True or False—Leaving an unmowed section near a field is a bad conservation practice because it prevents wildlife from traveling from field to field.
ANSWER: False. It is a good idea because it provides habitat for wildlife.
WATER QUESTION: True or False—Fish migration up rivers may be stopped when dams are built.
ANSWER: True. Dams prevent fish from moving upstream unless special structures are built to let the fish get around them.
CITY QUESTION: True or False—Falcons are occasionally found in cities nesting on building ledges and feeding on pigeons.
ANSWER: True. Ledges are similar to cliffs used in the wild.
FOREST QUESTION: Why is the ivory-billed woodpecker possibly extinct?
ANSWER: Because most of the forests where it lived have been cut down.

FARM QUESTION: Which of these is not a pest to farmers? Wild dogs, blackbirds, sea otters, coyotes.
ANSWER: Sea otters.
WATER QUESTION: How might beavers cause problems for power companies?
ANSWER: Beavers interfere with water supplies for generators by building dams and blocking waterways.
CITY QUESTION: Which of these would a sparrow prefer for nesting? A wooden building with eaves and decorative woodwork or a modern skyscraper?
ANSWER: A building with eaves and woodwork because it provides more cavities for nesting.
FOREST QUESTION: True or False—Cutting down trees has an effect on forest wildlife.
ANSWER: True. The effect varies with the age, number, and kinds of trees removed. The change may be harmful to some wildlife, beneficial to others.

FARM QUESTION: True or False—Farm crops damage caused by birds totals over $60 million per year.
ANSWER: True. This includes birds eating corn, sorghum, and fruits.
WATER QUESTION: True or False—Fish used as live bait may escape and cause problems in lakes where they are not normally found.
ANSWER: True.
CITY QUESTION: True or False—Bats in your attic are believed by some to bring good luck.
ANSWER: True. This is an old superstition with no basis in fact.
FOREST QUESTION: True or False—Large herds of deer are better able to find food.
ANSWER: False.

FARM QUESTION: Snakes are usually considered bad neighbors. Why might they actually be good to have around?
ANSWER: They eat mice, which eat grain.
WATER QUESTION: How might a fast-growing aquatic plant cause a problem for pleasure-boaters?
ANSWER: Plants can clog waterways and catch in propellers.
CITY QUESTION: What sea birds could you find at a city landfill?
ANSWER: Gulls.
FOREST QUESTION: What human action contributed to the extinction of the forest-dwelling passenger pigeon?
ANSWER: Clearing the forest for farming.

FARM QUESTION: How are prairie dogs, which dig burrows in fields, dangerous to cows?
ANSWER: Cattle may break their legs by stepping in a prairie dog hole.
WATER QUESTION: What seafood do sea otters and people both enjoy?
ANSWER: Abalone, crab.
CITY QUESTION: What city bird likes to nest on building ledges?
ANSWER: Pigeon.
FOREST QUESTION: What industrious wild animal cuts trees for food and building material?
ANSWER: The beaver.

FARM QUESTION: True or False—Wild dogs, like coyotes, can cause problems for farmers by feeding on livestock.
ANSWER: True.
WATER QUESTION: Why is it poor planning to have a pond at an airport?
ANSWER: The pond would attract birds which can collide with airplanes.
CITY QUESTION: Which of these was introduced in 1851 and soon became a pest, the house sparrow or the robin?
ANSWER: The house sparrow.
FOREST QUESTION: What problem might farmers have if all the foxes were removed?
ANSWER: There may be more mice which would eat more grain.

FARM QUESTION: True or False—Many of a farmer's problems with wildlife occur because farmers unintentionally introduce new foods to wildlife while destroying old sources of food.
ANSWER: True.
WATER QUESTION: True or False--Jellyfish and clams can interfere with the cooling and intake systems of power plants.
ANSWER: True.
CITY QUESTION: How might a woodpecker cause problems with telephones?
ANSWER: By pecking nesting holes in wooden poles.
FOREST QUESTION: True or False—Deer and cars cause no problems for each other.
ANSWER: False. Collisions between the two frequently occur on highways.

FARM QUESTION: How can farmers reduce their grain losses to birds?
ANSWER: They can harvest crops promptly and plant crops that birds don't eat.
WATER QUESTION: Why is the European carp, which reproduces rapidly, a problem?
ANSWER: It can crowd out native fish, root up desirable vegetation, and make the water muddy.
CITY QUESTION: Why is the starling called an exotic?
ANSWER: Because it is not a native to this country.
FOREST QUESTION: True or False—Porcupines cause problems by cutting the tubes carrying maple sap used by Vermont sugarmakers.
ANSWER: True.

FARM QUESTION: What do coyotes eat sometimes that make them a pest to ranchers?
ANSWER: Livestock such as sheep, calves, turkeys, chickens, etc.
WATER QUESTION: True or False—Fish sometimes require screens to keep them out of irrigation ditches.
ANSWER: True.
CITY QUESTION: Name a common insect that has become adapted to living with people.
ANSWER: The cockroach, house fly, or silverfish.
FOREST QUESTION: What might happen if chickens were raised in an unprotected area where there are several foxes?
ANSWER: Raids by foxes on the chickens.

FARM QUESTION: True or False—Some mice can eat their weight in food every day.
ANSWER: True.
WATER QUESTION: True or False—Conflicts can arise when a canal is built which links two bodies of water.
ANSWER: True. A canal will allow fish from one area to move into another where they might cause problems.
CITY QUESTION: What city food source do raccoons and opossums share?
ANSWER: Garbage.
FOREST QUESTION: True or False—Grizzly bears have become adapted to living with people and farms as well as native forests.
ANSWER: False. A grizzly bear needs a large amount of open land to satisfy its needs.

FARM QUESTION: What new food source might a deer that lives near a farm enjoy?
ANSWER: Crops such as corn, alfalfa, wheat, etc.
WATER QUESTION: How do jellyfish cause a problem in resort areas?
ANSWER: They can wash ashore and sting swimmers.
CITY QUESTION: True or False—Pigeons are important in a city because restaurants like to cook and serve them.
ANSWER: False.
FOREST QUESTION: True or False—$175 million damage is done to timber by wildlife each year.
ANSWER: True.

FARM QUESTION: What crop caused the boll weevil to extend its range from the Rio Grande area to Southern States such as Alabama?
ANSWER: Cotton.
WATER QUESTION: True or False—Straightening and deepening a river causes no problems for the fish that live there.
ANSWER: False. Changing the shape of a river affects the kinds and numbers of fish that can live there.
CITY QUESTION: True or False—House sparrows are a problem only in cities in New England.
ANSWER: False. They are found across North America.
FOREST QUESTION: Which of these has become best adapted to the decreasing number of forests: grizzly bear, raccoon, or mountain lion?
ANSWER: Raccoon.

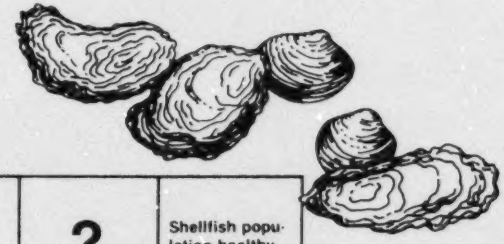
Name:

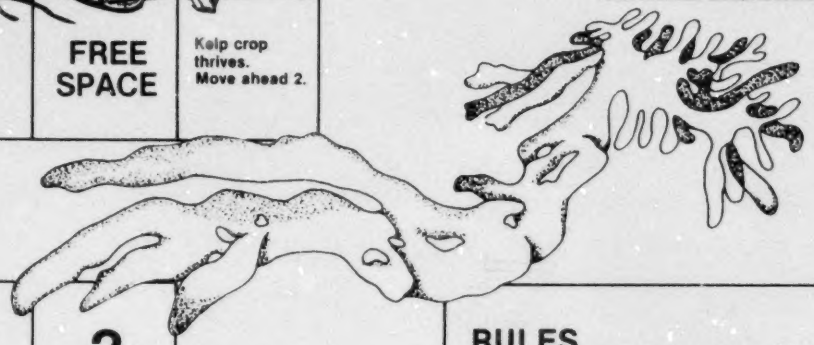
Game Questions for Habitat Hopscotch

FARM QUESTION: In frontier days, what wild animal competed with domestic cattle for grazing range?
ANSWER: The bison.
WATER QUESTION: True or False—Placing hatchery-reared sport fish in a stream never affects the native fish.
ANSWER: False. The hatchery fish can compete for food with the native fish.
CITY QUESTION: Certain open urban areas provide wildlife habitat. Name one of these.
ANSWER: Parks, golf courses, cemeteries, racetracks, airports.
FOREST QUESTION: Would it be better for wildlife if people entirely clear an area or clear some areas of trees and leave others?
ANSWER: It is usually better to clear some areas and leave nearby ones. However, certain birds or animals may benefit if large areas are cut.

FARM QUESTION: How can birds help farmers?
ANSWER: By reducing insect populations.
WATER QUESTION: True or False—Wastes from cities can pollute coastal areas and make oysters and clams harmful to eat.
ANSWER: True.
CITY QUESTION: What can starlings use instead of trees when they nest in the city?
ANSWER: Holes and cavities in buildings.
FOREST QUESTION: True or False—It is good to leave dead trees in the woods because they can be good homes for animals such as raccoons, squirrels, and songbirds.
ANSWER: True.

Water





		?	?	?
		?		
Beavers dam up your irrigation ditch. Move back 2.	?	?	FREE SPACE	Kelp crop thrives. Move ahead 2.
?				
?	Ducks in airport pond. Move back 1.	?	?	
			?	
			?	

				Shellfish population healthy. Move ahead 2.
			FREE SPACE	?
				?

RULES

1. The object of the game is to be the first to reach the "Wildlife Refuge."
2. To see who goes first, each player rolls the die. Whoever gets the highest roll plays first. Play then continues to the right.
3. To play, roll the die, move your marker that many spaces, and see where you land. A "hot spot" gives you information and moves you forward or back, and a question mark means you have to draw a question card.
4. If you land on a question mark, have the player to your right take the top card from the stack and read you the question for the section of the board you are on. After you answer, the

Name:

Name:

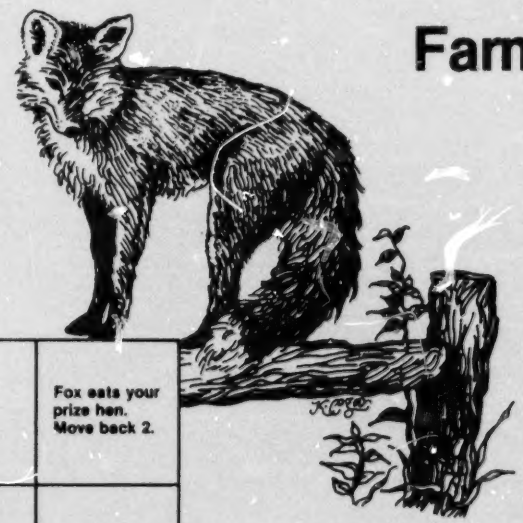
City

CARDS

		?						
		FREE SPACE						
Mole digs tunnels through your lawn. Move back 1.	?	?						
?								
?		FREE SPACE	?	Squirrel chews your phone line. Move back 2.				
?	Cockroaches leave your house. Move ahead 1.	?		?	?	Your building discourages pigeons. Move ahead 2.	?	?
								?
								?

START

Farm



	FREE SPACE	?	?			
?	?		?	?	?	Fox eats your prize hen. Move back 2.
	Your scarecrow works! Move ahead 2.	?	?		?	
					No lambs lost to golden eagles. Move ahead 1.	?
						?
					Boll weevils find your cotton. Move back 1.	
			?	FREE SPACE	?	

player with the card will read the correct answer to you. If you were right, move ahead one. If you weren't, move back one space. Return the card to the bottom of the deck.

5. A player's turn is over after the player has landed on a space and followed any instructions there. Although the instructions may direct the player to move to a new square, this new square should be regarded as a free space. The player does *not* follow any instructions on the second square.

6. The game is over when one player reaches the "Wildlife Refuge." Remember, to win you must roll the exact number needed.

Wildlife Refuge

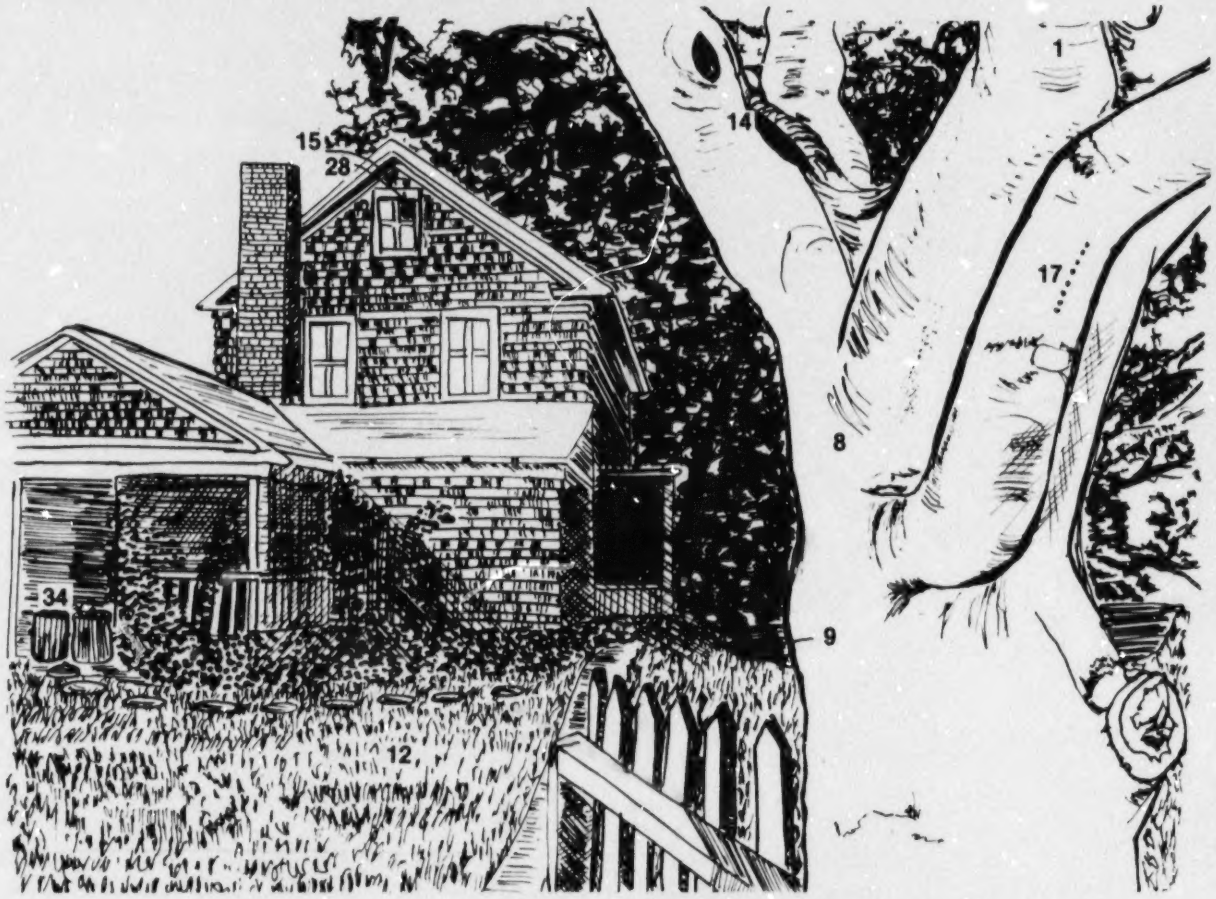
?			
?			
FREE SPACE	?	?	Deer wait for your car to pass before crossing road. Move ahead 1.
			?
		?	?
	Russian boar imported to forest. Move back 1.	?	Beavers get to your timber harvest before you do. Move back 2.
Wildlife refuge established. Move ahead 2.	?	?	?
?			
?	FREE SPACE		

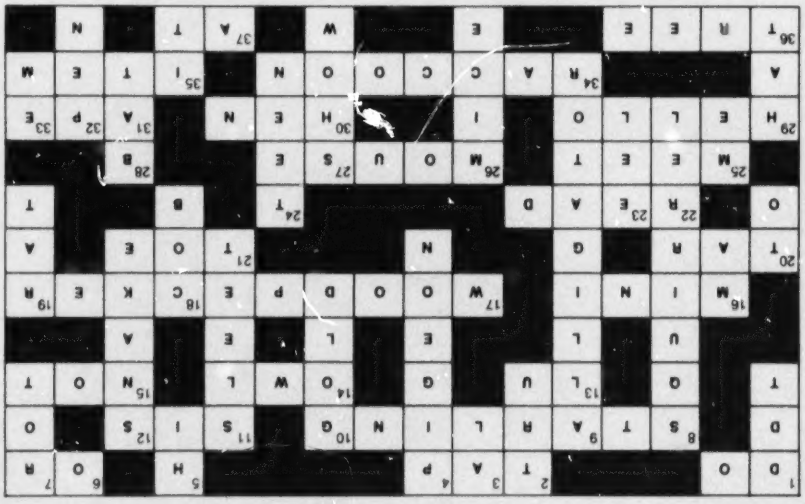
Forest

Name:

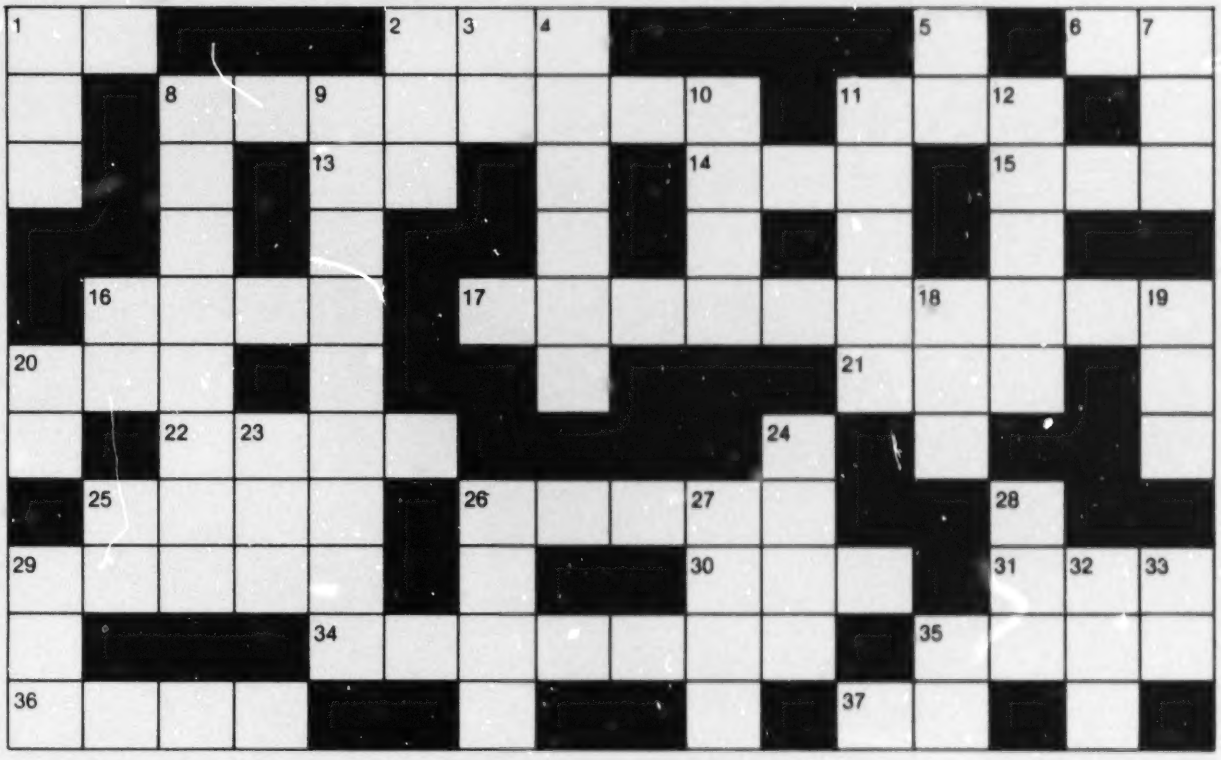
Name:

The house below is chockfull of nooks and crannies for a variety of wildlife species. Each numbered space in the house suits a certain animal. The name of this animal can be found in the crossword puzzle on the other side with the clue that matches its number. Fill in both the animal and word "nooks" on the front and back of this sheet.





Name:



ACROSS

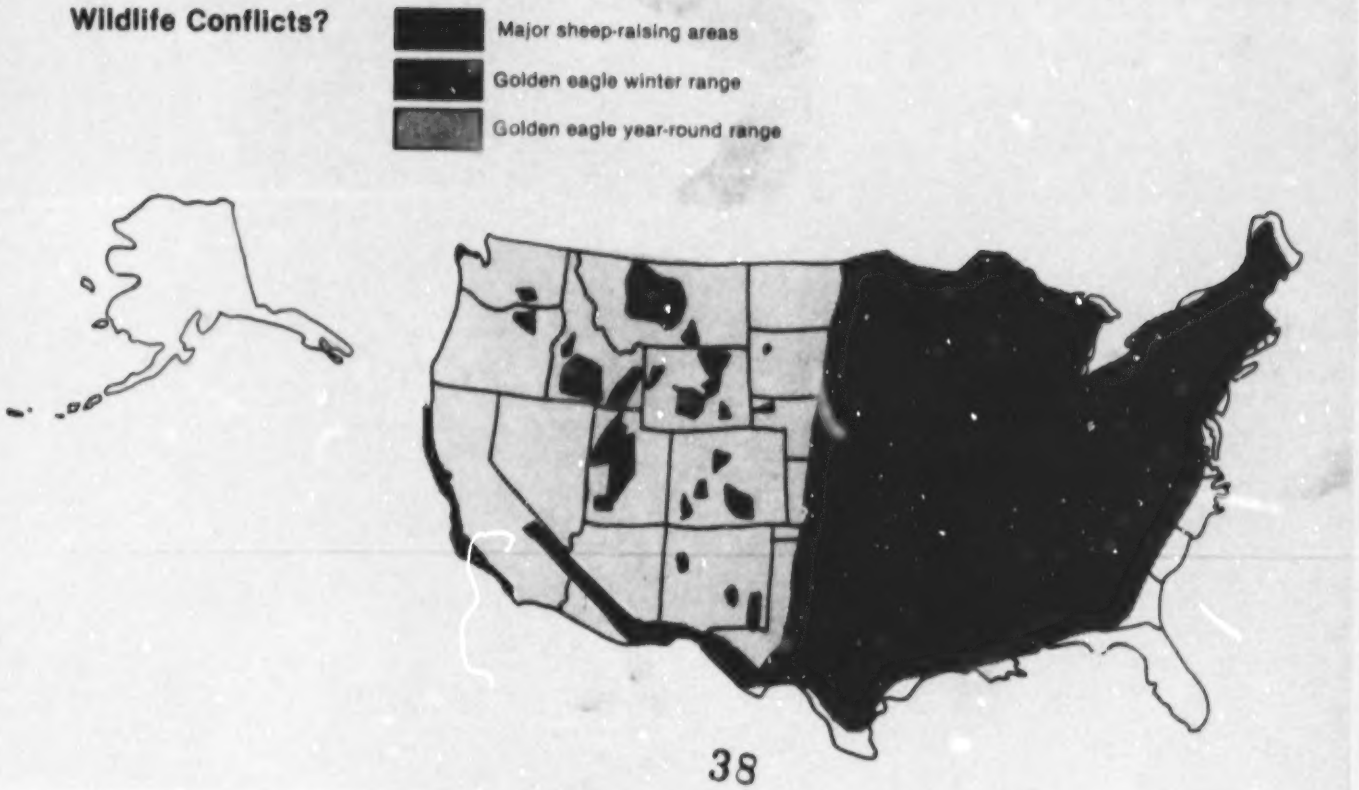
1. Musical note.
2. Hot or cold water _____.
6. Neither, nor; either, _____.
8. "Black bird," nests in holes.
11. Slang for "sister."
13. Girl's name, short for "Lulu."
14. Great horned, screech, or hoot; bird that eats 26-across and 26-down.
15. A starling is _____ a native bird.
16. Tiny, small.
17. Bird whose beak taps on trees.
20. _____ and feather.
21. A "finger" on a foot.
22. What you do with books.
25. Introduce.
26. Animal like a small rat.
29. Not goodbye.
30. What a fox gets from the chicken coop.
31. Monkey relative.
34. Furry "bandit" noted for garbage raids.
35. One thing on a list.
36. Where birds often nest.
37. In a certain place.

Note: Crossword puzzle answers appear upside down on Student Page 1.

DOWN

1. Banned pesticide.
2. T-R-U-F minus E.
3. Boy's name, possibly short for Albert.
4. Very common bird found in parks, roofs, etc.
5. Short form of 29-across.
7. To decay or spoil.
8. Tree-climbing rodent.
9. Relative of the crocodile.
10. Wedding ring metal.
11. Frozen rain.
12. Legless reptile.
16. Short for "mother."
18. Left after the corn is eaten.
19. A sometimes household pest, which looks like a large 26-across.
20. Not too or two.
23. Slippery as an _____.
24. _____ager, between the ages of 12-20.
25. I, myself.
26. More than one 26-across.
27. _____ and tell.
28. Can be found in caves or maybe in an attic.
29. Hard _____.
32. Not a pencil.
33. Auntie _____ and Uncle Henry in *The Wizard of Oz*.
35. He, she, _____ (third-person pronoun).

Wildlife Conflicts?



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6 P.O. Box 25486
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Department of the Interior
U.S. Fish and Wildlife Service

National Institute for Urban Wildlife

10921 Trotting Ridge Way Columbia, Maryland 21044

The mission of the National Institute for Urban Wildlife is to be a responsible and effective scientific and educational organization advocating the enhancement of urban wildlife values and habitat and the wise use of all natural resources for the benefit of people in cities, suburbs, and developing areas.

The Institute is the only private national conservation organization with programs dealing almost exclusively with fish and wildlife in urban and other disturbed areas. Funded through private and corporate contributions, grants and contracts, it is filling some of the glaring gaps in information and methodologies needed for the management and enjoyment of wildlife and wildlife habitats in urban areas.

The Institute accomplishes its mission by (1) conducting sound research on the relationship between man and wildlife under urban and urbanizing conditions; (2) discovering and disseminating practical procedures for maintaining, enhancing or controlling certain wildlife species in urban areas; and (3) by building an appreciation for, and understanding of, wildlife and a positive conservation ethic at the local community and neighborhood level, and illustrating how all segments of our people have a vested interest in wildlife and the environment we mutually share.

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